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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Keping Yan

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EXAMINER

BRAYTON, JOHN JOSEPH

ART UNIT

PAPER NUMBER

1724

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/573,923	Applicant(s) YAN, KEPING	
	Examiner John Brayton	Art Unit 1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims Pending

1. Claims 1-20 are pending.

Response to Amendment

2. Applicant's amendment filed September 3, 2010 has been entered but does not place the application in condition for allowance.

Claim Objections

3. Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 20 does not add any structural limitation to parent claim 1. Claim 20 only requires that a positive streamer discharge is formed. Apparatus claims are limited by structure or means for language that links a particular function to a structure recited in the specification. MPEP 2114, 2115.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 5, 15 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a

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way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 5, 15, and 20 recite a “positive DC voltage component”. The Examiner has reviewed the specification and drawings but is not able to find a positive DC voltage component applied to the discharge electrode.

Claim 15 recites a “punched-out” spaces of the elongated body. The Examiner has found support for a punching operation in paragraph 35, the Examiner does not conclude that this gives support for punching out the spaces because paragraph 35 describes forming cams and edges by a punching operation.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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8. Claims 1-5, 9, 10, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grass (US 6,282,106) in view of Goudy (US 2002/0170817).

Regarding claim 1, Grass teaches an apparatus for generating corona discharges, comprising a structure defining a corona discharge space (electrostatic filter 14);

a discharge electrode disposed in the corona discharge space (14, 15, 17);

as well as a high voltage source (L1, L2, L3,), an output of which is connected to the discharge electrode (15, 17),

a diode element (1) connected between the high voltage source (L1, L2, L3) and the discharge electrode (15, 17), the diode element delivering to the discharge electrode a DC high voltage component comprising a superposed AC high voltage component (The Examiner takes the position that Grass teaches the high voltage source and diode functionality therefore it must also be capable of performing the function of DC - AC superposition).

The Examiner takes the position that Grass does not explicitly teach the DC component is positive because Grass teaches a negative polarity is provided to the electrode (col. 5, ln.34). The input of the main line is 380 V three phase. It is unknown to Grass, other than the statement that a negative polarity is provided to the electrode, which portion of the AC waveform is block by the Grass rectification. Therefore the Examiner must conclude that Grass does not teach a DC positive component.

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Goudy teaches a discharge electrode charged with a positive polarity (pg. 19, [0200]).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the polarity of the discharge electrode of Grass by providing a positive DC voltage component to the discharge electrode, as taught by Goudy, because it would increase the extent of corona discharge through which the gas must flow (pg. 18, [0200] of Goudy).

Regarding claim 2, Grass teaches a diode element comprises a rectifier, a transistor, a diode or a thyristor (1, Fig. 1).

Regarding claim 3, Grass teaches the diode element comprises a single-phase rectifier. The Examiner takes the position a single phase rectifier requires two diodes back to back, this is indicated by reference number 1 in Figure 1 of Grass.

Regarding claim 4, Grass teaches an apparatus according to claim 1, wherein the diode element comprises a bridge rectifier (11, Gratz circuitry, col. 5, ln. 25-30).

Regarding claim 9, Grass teaches the structure defining the corona discharge space comprises at least two parallel, electrically earthed plates (15, col. 5, ln. 30-35), the discharge electrode (17) extending in parallel relationship with and between the plates.

Regarding claim 10, Grass shows a resistor (box) in series with an inductor (coil) directly after L1, L2, L3 in figure 1. Therefore Grass teaches an

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inductance-resistance circuit connected to the discharge electrode, wherein the diode element is connected in series with the inductance resistance circuit.

Regarding claims 5 and 16, Grass teaches a DC high voltage is 110 kV (col. 5, ln. 31). Grass does not explicitly teach a positive voltage in the ranges required by Applicant.

Goudy teaches a positive DC high voltage is 2.5 kV to 10 kV (pg. 15, [0167], pg. 19, [0200])).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the DC high voltage of Grass by providing a DC high voltage in the range of 10-60kV or 5-35 kV, as taught by Goudy, because it would generate ozone to disinfect water or other medium (pg. 2, [0018] of Goudy).

Regarding claim 20, Grass teaches the diode element delivers to the discharge electrode a DC voltage component comprising the superposed AC high voltage component so as to form a streamer corona plasma within the corona discharge space (col. 5, ln. 35-40).

Grass does not explicitly teach forming a positive streamer corona plasma.

Goudy teaches applying a positive potential to the discharge electrode (pg. 20. [0200])).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the diode element of Grass to deliver to the discharge electrode the positive DC voltage so as to form a positive streamer

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corona plasma within the corona discharge space, as taught by Goudy, because it would increase the extent of corona discharge through which the gas must flow (pg. 18, [0200] of Goudy).

The Examiner takes the position that claim 20 does not add any further structural limitation to the parent claim. Therefore since Grass and Goudy teach the limitations recited in claim 1 the combination would also be capable of performing the function recited in claim 20.

9. Claims 1-3, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 4,233,039) in view of Goudy (US 2002/0170817).

Regarding claim 1, Schmidt teaches an apparatus for generating corona discharges, comprising

a structure defining a corona discharge space (1, Fig. 1, col. 2, ln. 28);

a discharge electrode disposed in the corona discharge space (11);

as well as a high voltage source (R, S, T, 2, 6, 7, 8), an output of which is connected to the discharge electrode (11),

a diode element (33, 34, 8) connected between the high voltage source and the discharge electrode (11), the diode element delivering to the discharge electrode a DC high voltage component comprising a superposed AC high voltage component (Abstract, col. 2, ln. 3).

Schmidt teaches a DC power supply with positive and negative terminals, one of which may be connected to the center tap of the primary winding transformer (col. 2, ln. 54), but does not explicitly teach a diode element delivering a positive voltage component to the electrode.

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Goudy teaches a discharge electrode charged with a positive polarity (pg. 19, [0200]).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the polarity of the discharge electrode of Schmidt by providing a positive DC voltage component to the discharge electrode, as taught by Goudy, because it would increase the extent of corona discharge through which the gas must flow (pg. 18, [0200] of Goudy).

Regarding claim 2, Schmidt teaches the diode element comprises at least one of a rectifier, a transistor, a diode or a thyristor (33, 34, 8, col. 2).

Regarding claim 3, Schmidt teaches the diode element comprises a single-phase rectifier (8, Fig. 1, col. 2, ln. 30-35).

Regarding claim 13, Schmidt teaches the high voltage source comprises an AC to DC pulse converter (R,S,T, 2, 31, 32, 35).

10. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grass and Goudy as applied to claim 10 above in view of Duncan (US 2,838,737).

Regarding claim 11, Grass teaches an inductor L with an inductance value, but does not explicitly teach adjustability.

Duncan teaches the inductance resistance circuit has an adjustable inductance value(col. 1, ln. 55-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inductor of Grass by providing an inductor

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with an adjustable inductance value, as taught by Duncan, because it would allow the circuit to be tuned (col. 1, ln. 55-60).

The Examiner takes the position that generally the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA) 1954. MPEP 2144.

Regarding claim 12, Grass teaches an inductor but does not teach an inductance value.

Hartmann teaches an inductance value ranges between 1 nH and 1000 mH (col. 4, ln. 34) because it would improve the efficiency of the system (col. 2, ln. 45).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the inductance value of Grass by providing an inductance value ranges between 1 nH and 1000 mH, as taught by Hartmann, because it would improve the efficiency of the system (col. 2, ln. 45).

11. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grass and Goudy or Schmidt and Goudy as applied to claim 1 above in view of Galimberti (GB 2014799 as cited on the IDS).

Regarding claims 7 and 8, neither Grass nor Schmidt explicitly teach the discharge electrode is an elongated body having a plurality of projecting members that extend on either side of the body.

Galimberti teaches the discharge electrode is an elongated body having plurality of projecting members (14, Fig. 6), and wherein said projecting edges extend on either side of said body (Fig. 7, pg. 2, ln. 25-40).

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Grass or Schmidt by providing discharge electrode is an elongated body having several projecting edges or cams, and wherein said projecting edges extend on either side of said body, as taught by Galimberti, because it would avoid side discharges (pg. 2, ln. 36).

12. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grass and Goudy as applied to claim 10 above, in view of Masuda (US 4,541,848).

Regarding claim 13, Grass does not explicitly teach the high voltage source comprises an AC to DC pulse converter.

Masuda teaches a high voltage source is a AC to DC pulse converter (col. 3, ln. 20-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the high voltage source of Grass by providing a AC to DC pulse converter, as taught by Masuda, because it would allow the power loss in the charging process to be extremely small (col. 3, ln. 27 of Masuda).

13. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt and Goudy as applied to claim 1 above, in view of Grass (as cited above).

Regarding claim 14, Schmidt does not explicitly teach the high voltage source is an AC to DC to AC converter.

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Grass teaches the high voltage source is an AC to DC to AC converter because it would provide controllable power (col. 5, ln. 47-64).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the power supply of Schmidt by providing an AC to DC to AC converter, as taught by Grass because it would provide controllable power (Col. 5, ln. 47-64 of Grass).

14. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grass and Goudy or Schmidt and Goudy as applied to claim 1 above, in view of Inomata (JP 2001-170441).

Regarding claims 6 and 17, neither Grass nor Schmidt explicitly teach the frequency of the AC high voltage is 0.1-100 kHz or 5-30 kHz.

Goudy teaches applying voltage at a frequency of 25kHz to 120 kHz, but doesn't explicitly teach it to be an AC voltage (pg. 13, [0148]).

Inomata teaches the AC high voltage is 0.1-100 kHz or 5-30 kHz (Derwent Abstract).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the frequency of the AC high power of Grass or Schmidt by providing the AC high voltage is 0.1-100 kHz or 5-30 kHz, as taught by Inomata, because it would remove malodorous gas components from air (Derwent Abstract).

15. Claim 15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goudy (US 2002/0170817) in view of Grass (US 6,282,106) or Schmidt (US 4,233,039).

Regarding claim 15, Goudy teaches a discharge electrode disposed within a structure defining a corona discharge space for generating corona discharges (fig. 18 or 34),

the discharge electrode receiving a positive DC high voltage component or an AC high voltage component (pg. 13, [0151], pg. 19, [0200]),

the discharge electrode (504, Fig. 34 or 181, Fig. 18; pg. 9, [0113-0117]) comprising an elongated body having a plurality of projecting members extending on at least one side of the body (525),

wherein the elongated body comprises at least one elongated strip with the projecting members separated by punched out spaces (523, Fig. 34).

The Examiner regards the limitation “punched out spaces” a limitation directed to the method of making the elongated electrode and therefore this limitation does not further limit an apparatus claim. MPEP 2114.

Goudy does not explicitly teach the discharge electrode receiving from a diode element a positive DC high voltage component comprising a superposed AC high voltage component.

Grass and Schmidt each teach the discharge electrode (11, Fig. 1, of Schmidt) or (17, Fig. 1 of Grass) receiving from a diode element a DC high voltage component comprising a superposed AC high voltage component (2, 6, Fig. 1 of Schmidt) and (1, Fig. 1 of Grass).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Grass or Schmidt by providing teach the discharge electrode receiving from a diode element a positive

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DC high voltage component comprising a superposed AC high voltage component, as taught by Grass or Schmidt, because it would increase the degree of ionized gas to be purified (col. 1, ln. 17-20 of Schmidt).

Regarding claim 18, Goudy teaches the projecting members comprise a plurality of cams formed in series along the elongated strip (504, Fig. 31, pg. 14, [0155-0157]).

Regarding claim 19, Goudy teaches a spacing between successive cams may be adjusted and varied to achieve desired operation of the corona generator (pg. 14, [0157]). Therefore the Examiner takes the position that Goudy recognizes that the spacing between the cams is a variable that effects the operation of the reactor.

It would have been obvious to one having ordinary skill in the art at the time of the invention to space successive cams at distances between 1-100mm, since it has been held that discovering an optimum range of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

16. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

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See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Brayton whose telephone number is (571)270-3084. The examiner can normally be reached on 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

/J. B./
Examiner, Art Unit 1724
November 10, 2010